ABDEL RAHMAN, University of Regina

Homogeneous Levi Foliations

Let G_0 be a closed, connected subgroup of a connected complex Lie group G with H a closed complex subgroup of G and set $H_0 := G_0 \cap H$. Further assume that the (real) orbit $\Sigma := G_0/H_0$ is compact in the homogeneous complex manifold $X := G/H$, that $W_x := T_x\Sigma \cap iT_x\Sigma$ has constant dimension for all $x \in \Sigma$, and that the subbundle $W := \bigsqcup W_x$ is integrable. Then Σ is foliated by maximal connected complex submanifolds, called the leaves of the **Levi foliation** of Σ, that turn out to be homogeneous themselves under a complex subgroup of G contained in G_0 and whose tangent space at each $x \in \Sigma$ is W_x.

If Σ is an orbit in a complex projective space, then the leaves are flag manifolds, i.e., they are closed in Σ. Perhaps, more surprisingly, is the fact that if the isotropy H is discrete, then the basic building blocks that can occur are compact homogeneous complex manifolds and fiber bundles involving powers of S^1, the unit circle, lying inside corresponding powers of $\mathbb{C}^*$-bundles in X. We will outline how this happens, even in the setting where the leaves are dense - so no reasonable (i.e., Hausdorff) leaf space exists. This gives a rather explicit description of the structure even in this setting.